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THIRD CLASS

MR. T.H. NELSON, SYS. ENG.
INTERLOCKING SYS. CO.
BOX 1546
POUGHKEEPSIE, N.Y. M MOT 45



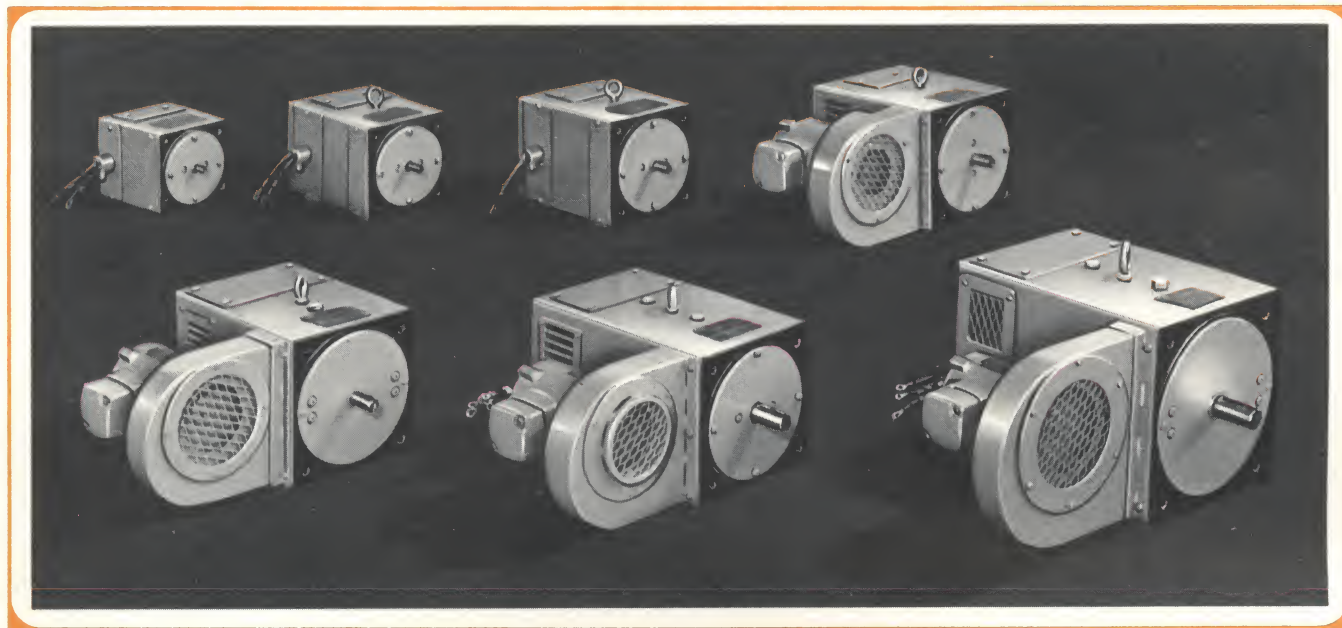
3547 REQUESTED

TECHNICAL DATA REQUESTED BY



PRINTED MOTORS, INC.

**MINERTIA
MOTORS**



Minertia Motors are dc servo motors incorporating a unique, slotless armature which has very low inertia, typically 1/10th that of an equivalent size conventional dc armature. The windings are placed directly on the slotless rotor core and bonded with epoxy resin and glass tape. This configuration results in superior servo characteristics for high performance applications.

One of the most important features of Minertia Motors is a high speed response. The slotless construction reduces the diameter of the armature and its inertia. This lower inertia combined with a high pulse torque capability results in maximum acceleration, as much as 40 times that of conventional motors. Even the 200SR, rated at 8 h.p., has a mechanical time constant of only .005 seconds.

Since the armature coils of Minertia Motors are few in number and are not enclosed in slots, the inductance and electrical time constant are very low. High pulse currents result in immediate torque output and commutation is sparkless up to 200% of rated current.

Preferred armature positions of conventional armatures produce pulsating torque at low speeds and make it difficult to stop the motor shaft at a desired point. The uniform windings and slotless construction of Minertia armatures eliminates this undesirable cogging.

The wide speed range typical of dc motors can be fully utilized with Minertias because of their unique construction. The absence of cogging allows use in direct drive down to 1 rpm. Excellent commutation because of the low inductance and the absence of vibration due to the small armature diameter allows rated speeds of 3000 rpm. (Primary resonance point of Minertia armatures is typically above 7000 rpm).

Standard Minertia Motors are available in eight sizes from 1/8 to 8 h.p. and are described in this catalog. Special models are available in modified configurations and larger ratings up to 200 h.p.

Minertia Motors are manufactured by Yaskawa Electric Manufacturing Co. Ltd., Tokyo, Japan. Printed Motors, Inc. is sole North American Sales Agent and stocking distributor.



Engineering, manufacturing and sales by Photocircuits Corp., Glen Cove, New York

NOMINAL RATINGS FOR STANDARD MINERTIA MOTORS

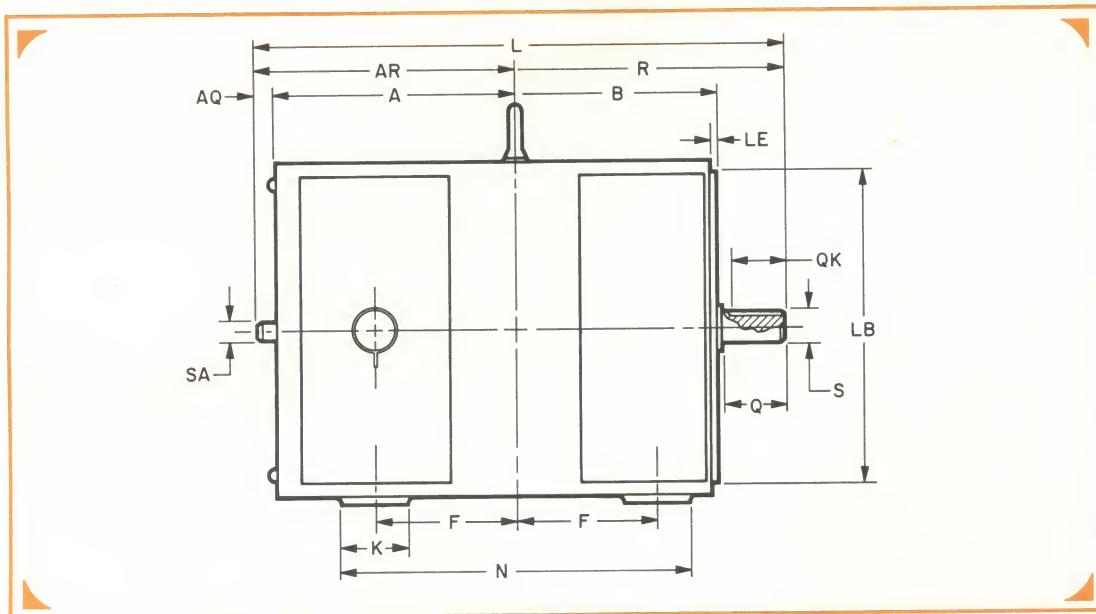
MODEL =	Continuous Torque at Rated Speed in Lb.-In.	Pulse Torque* in Lb.-In.	Pulse Torque* Current in Amp.	Rated Speed in RPM	Rated Voltage in dc volts	Power Out at Rated Speed in Watts	Rated Current in Amp.	Armature Resistance in Ohms	EMF Constant (K _e) in Volts Krpm	Torque Constant (K _t) in Lb.-In. Amp
3EM	2.6	26	57	3000	25	90	5.7	.73	6.2	.46
6EM	5.2	52	71	3000	34.5	180	7.1	.60	9.4	.73
13EM	11.3	113	78	3000	62	390	7.8	.88	18.1	1.45
25EM	17.4	218	108	3000	82	600	8.9	.73	24.5	1.96
25SM	21.8	218	108	3000	83	750	10.8	.73	24.5	2.02
50SR	43.5	435	125	3000	146.5	1500	12.5	1.06	43.0	3.48
100SR	87	870	318	3000	106.5	3000	31.8	.25	32.2	2.74
200SR	174	1740	490	3000	134	6000	49	.113	42.2	3.55

*One second rating

**Ratio of maximum permissible impulse power dissipation to motor mechanical time constant. Calculated from the formula:

$$\text{Power Rate} = 7.01 \times 10^{-6} \left(\frac{\text{Pulse Torque}^2}{\text{Inertia}} \right)$$

	Damping Constant (K) in Lb.-In.-Krpm	Armature Inertia (J) in Oz.-In.-Sec. ²	Armature Inductance in Millihenries	Average Friction Torque in Lb.-In.	Mechanical Time Constant in Seconds	Electrical Time Constant in Milliseconds	Power** Rate in Kilowatts/Sec.	Field Current in Amp.	Field Resistance in Ohms	Cooling
	3.69	.0036	.16	.17	.0049	.22	395	PERMANENT MAGNET	PERMANENT MAGNET	ENCLOSED
	8.00	.0089	.21	.29	.0044	.35	545	↓	↓	↓
	13.1	.023	.59	.43	.0046	.61	997	↓	↓	↓
	20.0	.044	.44	.72	.0040	.60	1939	↓	↓	↓
	20.0	.044	.44	.72	.0040	.60	1939	↓	↓	FORCED AIR COOLING
	36.9	.109	1.77	1.15	.0044	1.7	3116	2.28	38.6	↓
	62.5	.245	.67	1.7	.0044	2.7	5543	3.80	19.9	↓
	75.9	1.05	.46	2.6	.0050	4.1	5279	5.70	14.2	↓

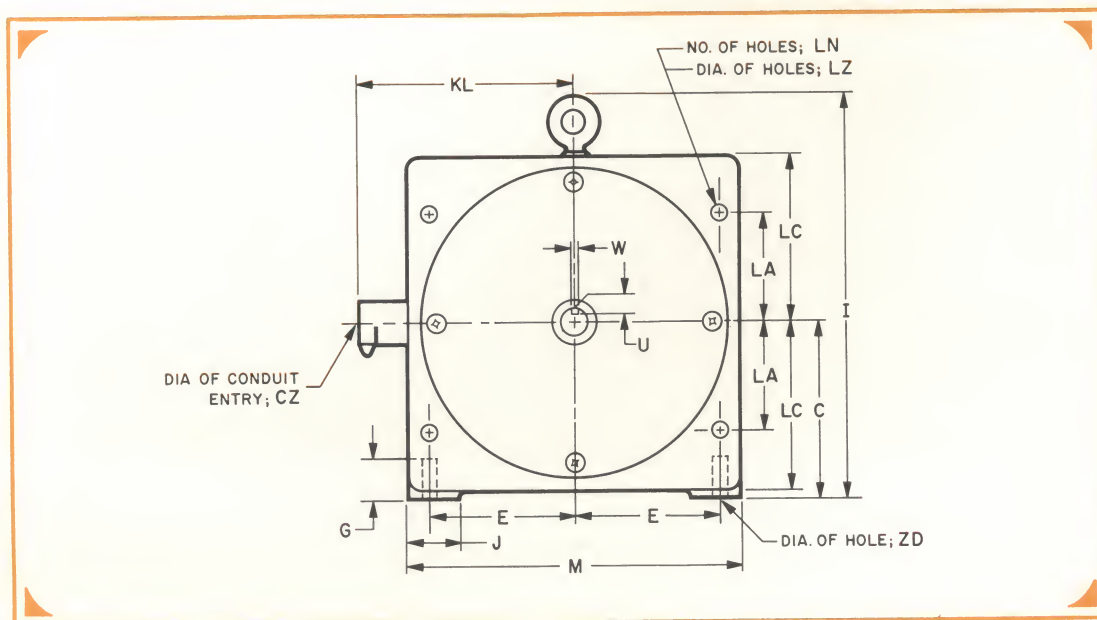


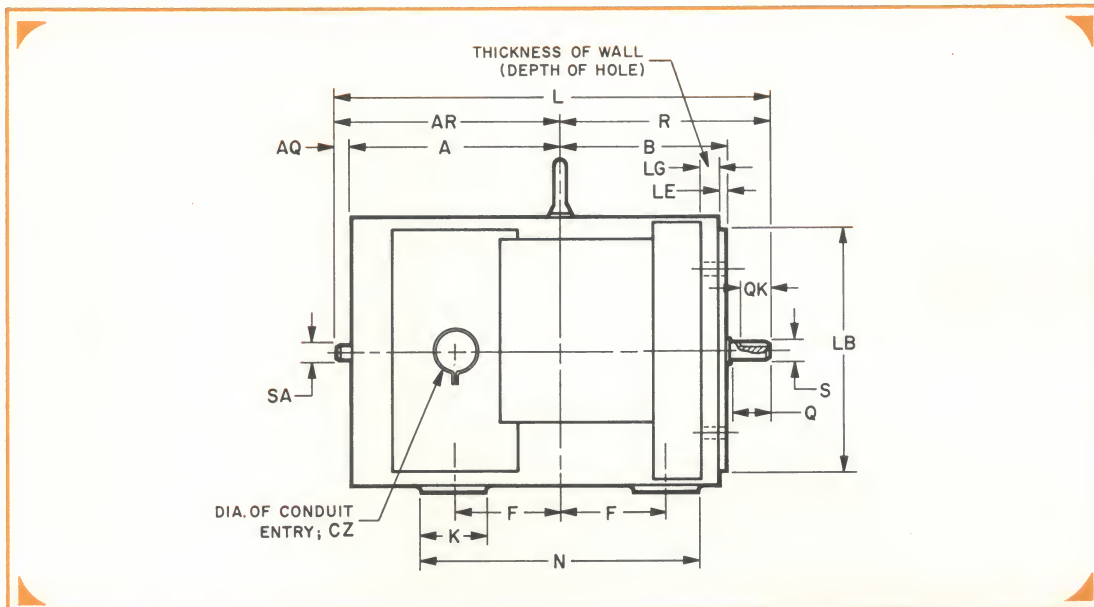
DIMENSIONS IN INCHES

Frame Number	A	B	C	E	F	G	I	J	K	L	M	N	KL	CZ	ZD
3-EM	3.58	2.79	2.75	2.36						7.67	5.51		3.93	0.90	
6-EM	4.92	3.74	3.346 ^{+0.000} _{-.019}	2.75	2.55	0.74	7.87	1.18	1.57	10.23	6.29	6.69	4.33	0.90	.35
13-EM	5.31	4.13	3.740 ^{+0.000} _{-.019}	3.05	2.95	0.78	8.66	1.18	1.57	11.22	7.08	7.48	4.72	0.90	.35
25-EM	5.70	4.72	4.133 ^{+0.000} _{-.019}	3.44	3.34	0.78	9.44	1.18	1.57	12.40	7.87	8.26	5.11	0.90	.35

DIMENSIONS IN INCHES

Frame Number	SHAFT END															FLANGE						Weight (lbs.)
	Q	QK	AQ	R	AR	S	SA	U	W	LA	LB	LC	LE	LN	LZ							
3-EM	0.90	.59	.31	3.77	3.89	.393 ^{+0.0007} _{-0.0003}	.314 ^{+0.0010} _{-0.0006}	.098 ^{+0.0044} _{-0.0023}	.157 ^{+0.0005} _{-0.0005}	1.57	5.118 ^{+0.0001} _{-0.0015}	2.75	0.118	4	.354	23						
6-EM	1.10	.78	.39	4.92	5.31	.472 ^{+0.0004} _{-0.0000}	.393 ^{+0.0007} _{-0.0003}	.098 ^{+0.0044} _{-0.0023}	.157 ^{+0.0005} _{-0.0005}	1.96	5.708 ^{+0.0007} _{-0.0009}	3.14	↕	↕	.354	40						
13-EM	1.29	.98	.39	5.51	5.70	.590 ^{+0.0006} _{-0.0001}	.393 ^{+0.0007} _{-0.0003}	.118 ^{+0.0040} _{-0.0020}	.196 ^{+0.0009} _{-0.0001}	2.16	6.496 ^{+0.0001} _{-0.0015}	3.54	↕	↕	.433	58						
25-EM	1.49	1.18	.39	6.29	6.10	.669 ^{+0.0003} _{-0.0001}	.393 ^{+0.0007} _{-0.0003}	.118 ^{+0.0040} _{-0.0020}	.196 ^{+0.0009} _{-0.0001}	2.55	7.283 ^{+0.0005} _{-0.0013}	3.93	0.118	4	.433	71						



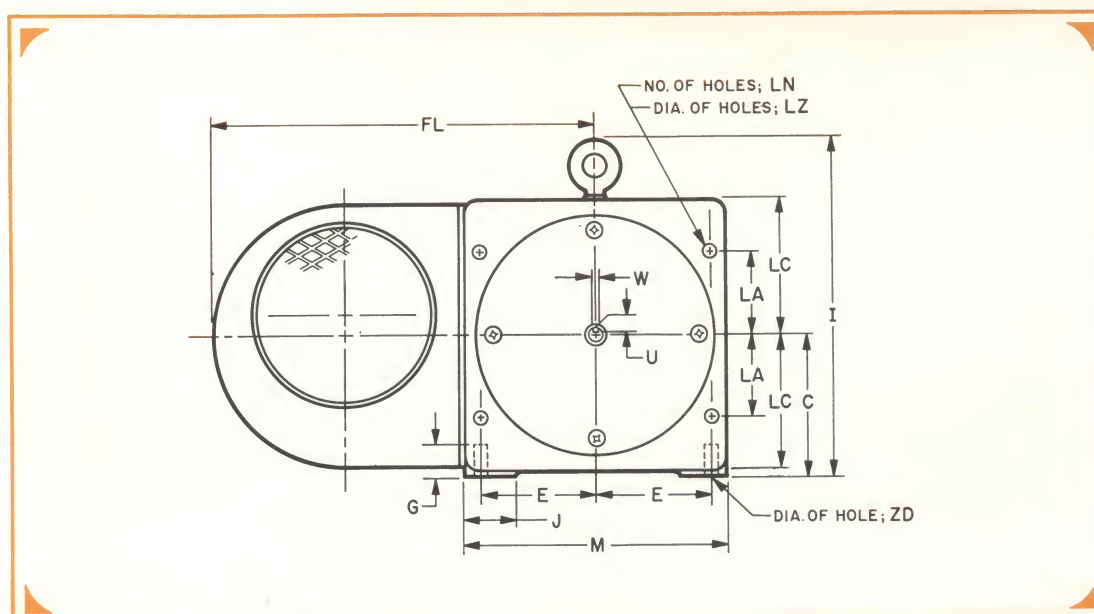


DIMENSIONS IN INCHES

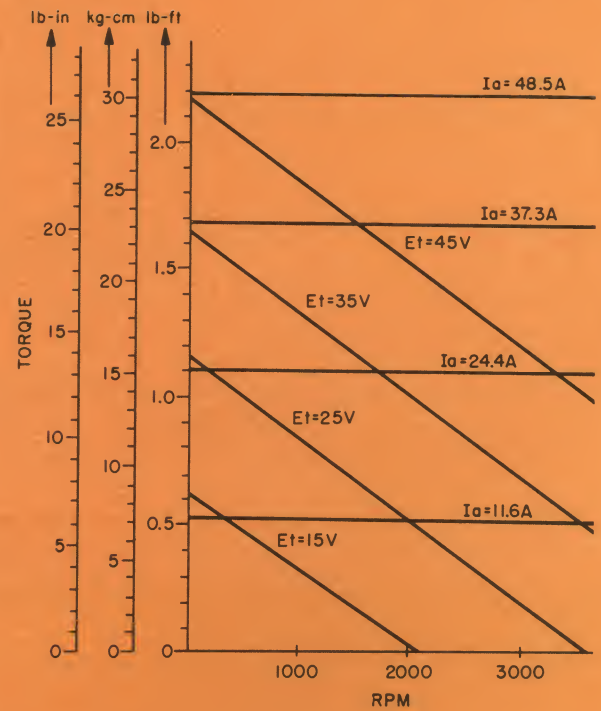
Frame Number	A	B	C	E	F	G	I	J	K	L	M	N	FL	CZ	ZD
25SM	5.70	4.72	4.133 $\begin{smallmatrix} +.000 \\ -.019 \end{smallmatrix}$	3.44	3.34	0.78	9.44	1.18	1.57	12.40	7.87	8.26	12.99	0.90	0.35
50SR	6.49	6.10	4.527 $\begin{smallmatrix} +.000 \\ -.019 \end{smallmatrix}$	3.74	3.93	0.78	10.62	1.57	1.96	14.96	8.66	9.84	13.38	1.33	0.43
100SR	7.28	6.69	4.527 $\begin{smallmatrix} +.000 \\ -.019 \end{smallmatrix}$	3.74	4.72	0.78	10.62	1.57	1.96	16.73	8.66	11.40	13.38	1.33	0.43
200SR	8.46	7.48	5.905 $\begin{smallmatrix} +.000 \\ -.019 \end{smallmatrix}$	4.92	5.51	0.98	13.78	1.57	1.96	19.09	11.41	12.99	17.72	1.61	0.59

DIMENSIONS IN INCHES

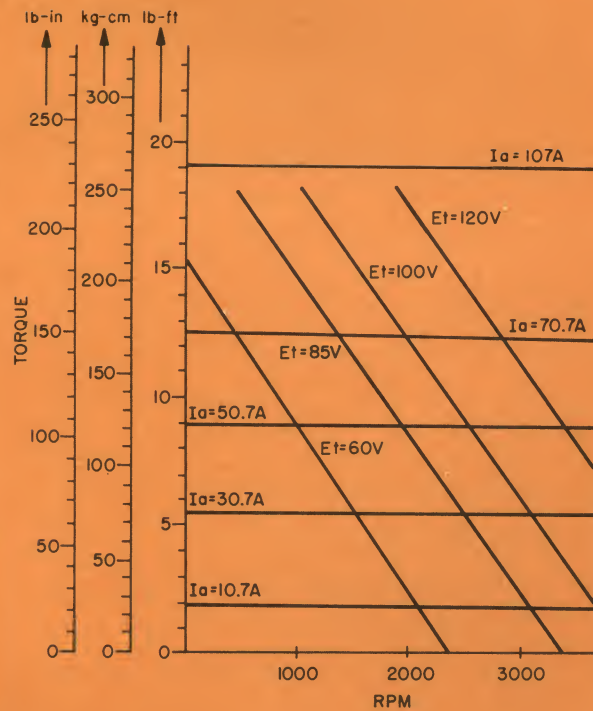
DIMENSIONS IN INCHES																	
Frame Number	SHAFT END									FLANGE							Weight (lbs.)
	Q	QK	AQ	R	AR	S	SA	U	W	LA	LB	LC	LE	LG	LN	LZ	
25SM	1.49	1.18	0.39	6.29	6.10	.669 ^{+.0003} _{-.0001}	.393 ^{+.0007} _{-.0004}	.118 ^{+.0040} _{-.0019}	.196 ^{+.0008} _{-.0002}	2.55	7.283 ^{+.0005} _{-.0013}	3.93	0.118	0.55	4	.433	99
50SR	1.69	1.37	0.59	7.87	7.08	.787 ^{+.0003} _{-.0001}	.590 ^{+.0005} _{-.0001}	.118 ^{+.0040} _{-.0019}	.196 ^{+.0008} _{-.0002}	2.95	8.070 ^{+.0008} _{-.0009}	4.33	↕	0.78	↕	.590	139
100SR	2.08	1.77	0.59	8.86	7.87	.984 ^{+.0003} _{-.0003}	.590 ^{+.0005} _{-.0001}	.157 ^{+.0064} _{-.0036}	.275 ^{+.0006} _{-.0006}	2.95	8.070 ^{+.0008} _{-.0009}	4.33	↕	0.78	↕	.590	172
200SR	2.48	2.16	0.59	10.04	9.05	1.181 ^{+.0001} _{-.0004}	.590 ^{+.0005} _{-.0001}	.157 ^{+.0064} _{-.0036}	.275 ^{+.0006} _{-.0006}	3.54	10.629 ^{+.0009} _{-.0011}	5.70	0.118	0.86	4	.708	309



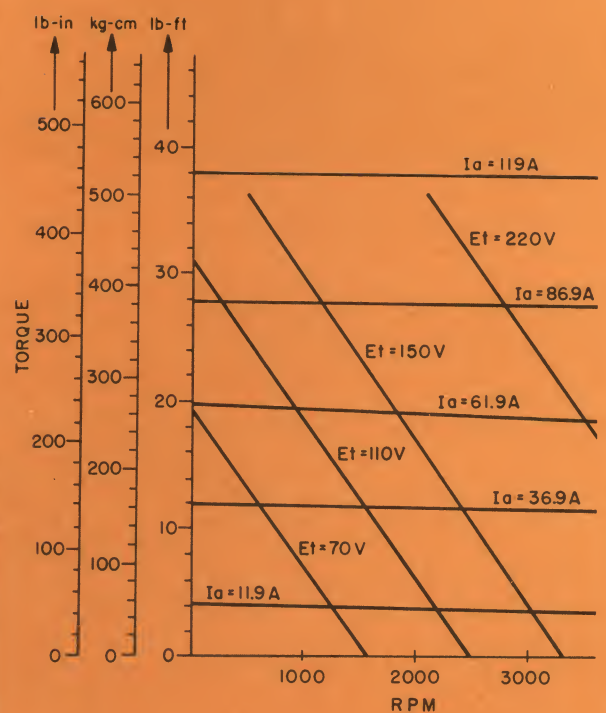
SPEED / TORQUE CHARACTERISTICS



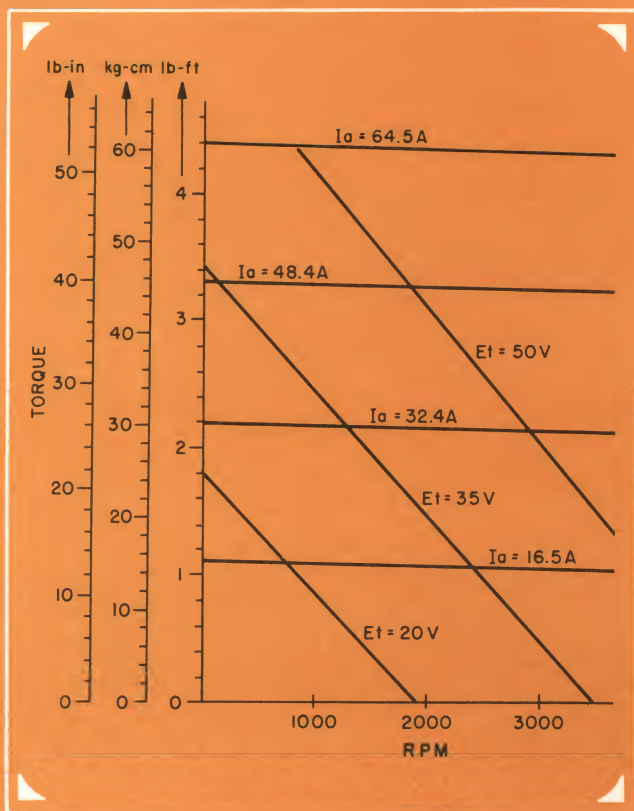
MODEL 3EM



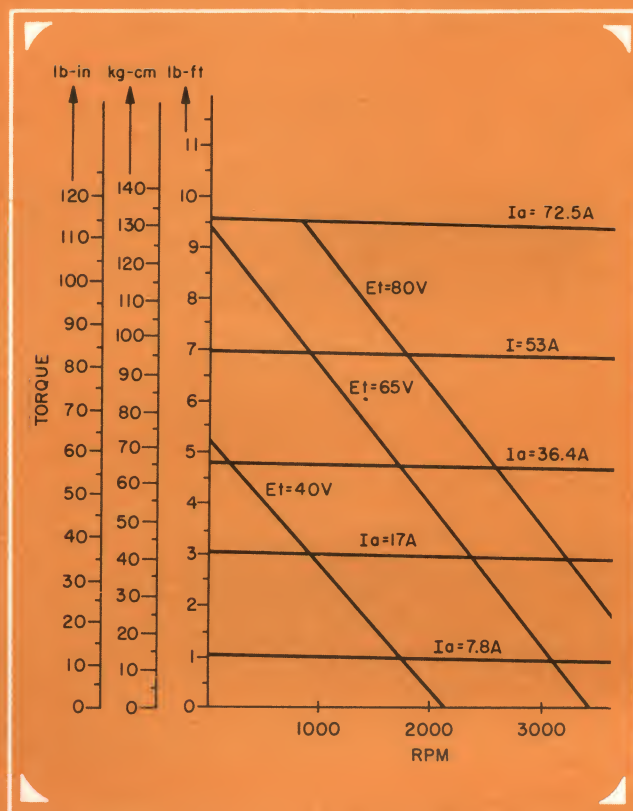
MODEL 25SM AND 25SR



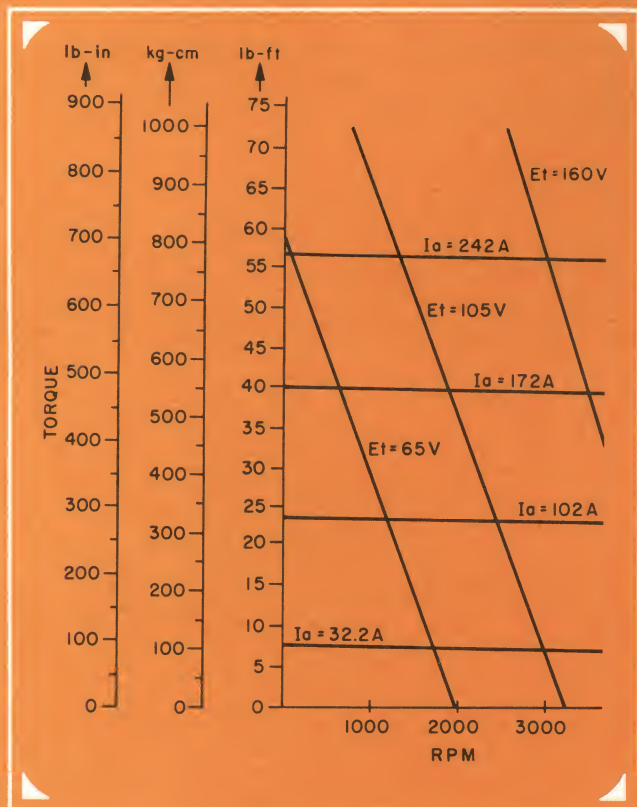
MODEL 50SR



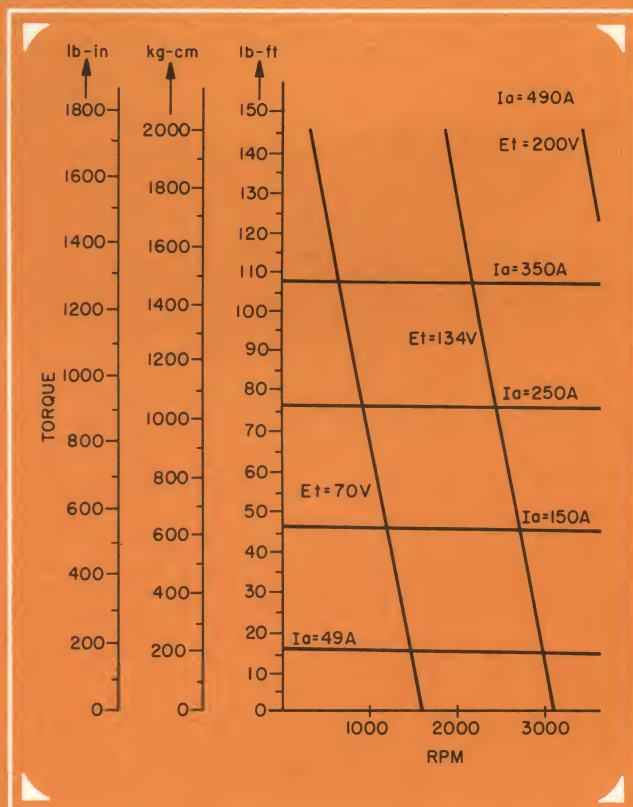
MODEL 6EM



MODEL 13EM



MODEL 100SR



MODEL 200SR



PRINTED MOTORS, INC.

GLEN COVE, NEW YORK

Engineering, Manufacturing and Sales by:

Photocircuits CORPORATION

MR. T.H. NELSON, SYS. ENG.

INTERLOCKING SYS. CO.

BOX 1546

POUGHKEEPSIE, N.Y. M NOT 45

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As part of your job, it's necessary for you to be aware of new developments in your field. We want to be sure of using the most efficient method of telling you about our new products and services. We would appreciate it if you could take 30 seconds to fill in the blanks below and drop this card in the mail.

PHOTOCIRCUITS CORPORATION
Market Research Department

1. Did you receive the material you requested?

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☐ NO

2. If not, what additional information can we send you? _____

3. Was the material you requested for:

- ☐ TECHNICAL FILES
- ☐ ACADEMIC INTEREST
- ☐ FUTURE APPLICATION
- ☐ IMMEDIATE APPLICATION

4. If you could read only one trade publication, which one would it be? _____

5. What trade shows do you attend? _____

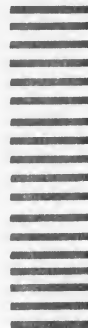
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Glen Cove

ATT: SALES PROMOTION DEPT. **New York 11542**





PRINTED MOTORS, INC.

PRICE LIST

effective 7/6/65

(PRICES SUBJECT TO CHANGE
WITHOUT NOTICE)

PRECISION PRINTED MOTORS

Quantity	258	368	368DS	368HF 368HF-11	488	488DS	668	668DS	858	1028
1-9	\$110	\$110	\$165	\$350	\$124	\$450	\$210	\$650	\$650	\$880
10-24	105	105	157	290	122	425	205	625	610	850
25-49	97	98	147	240	121	400	195	600	560	820
50-99	96	97	146	230	118	350	155	550	425	670
100-249	95	96	145	210	117	300	145	500	350	520
250-299	94	95	144	180	116	250	135	450	340	455
300-499	93	94	143	175	115	225	132	425	330	435
500-999	91	93	142	168	113	200	129	400	320	425
1000-2999	89	92	141	156	110	175	127	375	300	405

PRINTED MOTORS WITH OPTICAL TACHOMETERS

Quantity	D1500 (PM-368)	D2500 (PM-488)	D3500 (PM-668)	D1516 (PM-368HF)	D1509 *
1-4	\$460	\$514	\$610	\$705	\$725
5-9	447	496	580	670	695
10-24	439	480	550	635	660
25-49	421	461	520	600	625
50-100	415	455	490	565	590

*Incrementer Assembly: PM-368, Optical Tachometer, Servo-Tek Tachometer.
Prices shown are without preamplifiers. Add \$35 each for built-in preamplifier.
Larger quantity prices by special quotation.

MINERTIA MOTORS

Quantity	3EM (1/8 HP)	6EM (1/4 HP)	13EM (1/2 HP)	25EM (.8 HP)	25SM (1 HP)	50SR (2 HP)	100SR (4 HP)	200SR (8 HP)
1-4	\$335	\$405	\$505	\$600	\$680	\$885	\$1105	\$1365
5-9	320	385	480	570	650	845	1055	1290
10-24	305	365	455	545	620	805	1000	1235
25-49	290	350	435	515	585	765	950	1175
50-99	275	330	410	485	550	720	895	1100
100-199	260	315	395	465	530	690	860	1060
200	250	305	380	455	515	670	835	1030



Engineering, manufacturing and sales by Photocircuits Corp., Glen Cove, New York

"U" SERIES PRINTED MOTORS

Quantity	U9	U9C	U12	U12C
1-24	\$65	\$85	\$75	\$100
25-49	60	80	70	95
50-99	55	75	65	90
100-249	50	70	60	85
250-499	46	66	56	81
500-999	41	61	51	76
1000-2999	40	60	50	75
3000-4999	38	58	48	73
5000-9999	37	57	47	72
10,000	35	55	45	70

SHAFT MODIFICATIONS:

U9, U9C, U12, U12C can be supplied with .375" or .500" diameter shafts at \$1.00 per motor additional.

Equal projection of standard shaft front and back can be offset forward or backward. \$50 set-up plus \$.50 per motor additional.

Length of standard shafts can be shortened in $\frac{1}{16}$ " increments. \$50 set up plus \$1.00 per motor additional.

INCREDYNE

Quantity	Model 10C12
1-4	\$610
5-9	550
10-24	520
25-49	490
50-99	465
100-199	411
200	397

SERVO AMPLIFIER MODULES

Quantity	OA-1 (Operational Amplifier)	DA-1 (Drive Amplifier)	PA-1 (Power Amplifier)
1-4	\$55	\$60	\$95
5-9	42	47	88
10-24	36	41	79
25-49	31	36	72
50-99	28	32	65
100-249	26	29	62
250-499	22	25	58
500-999	20	22	51
1000	18	19	49

S-1 SERVO SYSTEMS

Quantity	S-1/368	S-1/488	S-1/668
1-9	\$975	\$1035	\$1140
10-24	890	935	1012
25-49	810	854	919
50-100	750	794	834

Modification of standard S-1 Systems to meet special applications will require an initial Engineering Design charge. Larger quantity prices by special quotation.

TERMS: Net 30 days,
FOB Glen Cove, N.Y.

